

CHAPTER V

CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

Generally, Tak Fa formation in the area of Khao Wong and Khao Chakkachan, Amphoe Nong Muang, Changwat Lop Buri, is composed of bedded limestone, flourished with the best index fossils: fusulinids and other invertebrate marine creatures including algae. The attitudes of bedding are mostly strike N 70 W and dipping 40⁰-15⁰ to west.

Field works on seven measured sections had been done and show that the limestone of Tak Fa formation at northwest of Khao Wong is totally 154.30 meters-thick, and is subdivided into 4 units : unit W₁, unit W₂, unit W₃, and unit W₄, while the two units at Khao Chakkachan : unit C₁ and unit C₂ is 78.20 meters- thick. The carbonate rocks are classified to be biosparite, biomicrite, and fossiliferous micrite.

The fusulinids identification shows that there are thirteen species of nine genera : *Neofusulinella lantenoisi* Deprat, *Neofusulinella cf. saraburiensis* Toriyama , Kanmera and Ingavat, *Chusenella cf. schwagerinaeformis* Sheng, *Parafusulina gigantea* (Deprat), *Parafusulina loeyensis* Pitakpaivan, *Parafusulina sp.A.*, *Pseudofusulina sp.* Dunbar and Skinner, *Verbeekina verbeeki* (Geinitz), *Metadoliolina nongmuangensis sp.nov.*, *Pseudodoliolina pseudolepida* (Deprat), *Colania douvillei* (Ozawa), *Sumatrina annae* Volz, and *Sumatrina cf. longissima* (Deprat). The data of fusulinids lead that Tak Fa fotation in this area is subdivided into 5 biozones and ranging from Middle Wordian to Middle Capitanian. The followings are biozones of Tak Fa formation in study area.

- *Pseudodoliolina pseudolepida*- *Neofusulinella lantenoisi* zone
- *Parafusulina gigantea* – *Parafusulina loeyensis* zone
- *Colania douvillei* zone
- *Metadoliolina nongmuangensis* zone
- Fusulinid barren zone

In stratigraphic correlation with the previously biostratigraphic zonation of fusulinids in adjacent areas, biozones at Khao Chakkachan is probably correlated with *Aghanella schencki schencki* zone at Khao Khao, Changwat Saraburi, approximately 75 km south of Khao Chakkachan (Toriyama and Kanmera, 1979). The *Aghanella schencki schencki* zone consists of *Aghanella schencki schencki* throughout the zone, *A. sumatrinaeformis* at upper three-fourth of the zone, *A. africana*, *A. pesuliensis*, *A. japonica* at upper half of the zone, *Pseudodoliolina pseudolepida* at lowermost of the zone, *Verbeekina (Paraverbeekina) pontica* at upper part of the zone, *Verbeekina verbeeki* throughout the zone, *Neoschwagerina cheni* at upper part of the zone, *Parafusulina gigantea* throughout the zone, *Pseudofusulina* sp., and *Chusenella* sp throughout the zone. The stratigraphic range of the zone species *Aghanella schencki schencki* is covers the middle part and the upper part of the Murghabian (Wordian).

Pseudodoliolina pseudolepida – *Neofusulinella lantenoisi* zone in the thesis area contains the same species as *Aghanella schencki schencki* zone, such as *Pseudodoliolina pseudolepida*, *Verbeekina verbeeki*, and *Parafusulina gigantea*. The difference species are *Sumatrina annae*, *Neofusulinella lantenoisi*, *Neofusulinella* cf. *saraburiensis* and *Parafusulina loeyensis*. The stratigraphic range of the zone is Middle Wordian. The data shows that Khao Chakkachan area contains less diversity in fusulinids, less thickness of rock unit than that of Khao Khao, thus, the local biozone at Khao Chakkachan may be subzone of *Aghanella schencki schencki* zone at Khao Khao. The difference of species may be the result of natural border in depositional environment.

Parafusulina gigantea – *Parafusulina loeyensis* zone in study area is composed of *Parafusulina gigantea*, *Parafusulina loeyensis*, and *Parafusulina* sp.A. This zone may be correlated with *Neoschwagerina haydeni* zone at Khao Khao, Changwat Saraburi (Toriyama and Kanmera, 1979), which Schwagerinid (*Parafusulina* and *Schwagerina*) species are fairly abundant. But the zone species *Neoschwagerina haydeni* is not found in the *Parafusulina gigantea* – *Parafusulina loeyensis* zone at Khao Chakkachan,

thus the zones at Khao Chakkachan may be a part of *Neoschwagerina haydeni* zone at Khao Khao.

The occurrence of abundant *Colania douvillei* along with *Sumatrina* cf. *longissima* at Khao Wong is generally restricted in time and a zone species to *Colania douvillei* - *Verbeekina verbeeki* zone at Khao I Mot, Changwat Saraburi (Toriyama, 1984).

Metadoliolina nongmuangensis zone, with profusely *Metadoliolina nongmuangensis* and commonly occur *Verbeekina verbeeki* at Khao Wong, can not correlated with any zone by the constituent species, but it may be correlated in time with *Aghanella schencki schencki* zone at Khao Khao (Toriyama and Kanmera, 1979).

In correlation with previous study of Tak Fa formation in Lop Buri area, Khao Somphot faunas are range from Asselian to Early Guadalupian or Roadian, and to Late Guadalupian or Capitanian (Weilchowsky and Young, 1985), thus, the Tak Fa formation in study area is equivalent in time to the upper part of Khao Somphot. At Khao Sanamjang, Amphoe Ban Mi, the dominated *Schwagerina* indicate Artinskian to Upper Sakmarian (Pitakpaivan, 1966), it conclude that the Tak Fa formation in study area is younger than those in Khao Sanamjang.

The schematic stratigraphic range of rock units in the thesis area is illustrated in Table 5.1. Remarkable conclusion in the Table is that the stratigraphic level of the rock at Khao Wong unit W_1 , which separated from unit W_2 by fault with attitude of fault plane N 55 W and dipping 50° to west, is higher in stratigraphic level than unit W_2 . The data of fusulinids shows that unit W_1 contains *Colania douvillei* and *Sumatrina* cf. *longissima* indicate Lower Capitanian to Middle Capitanian, while unit W_2 consists of the new species of *Metadoliolina* along with the Wordian *Chusenella* cf. *schwagerinaeformis* and Lower Roadian to Upper Capitanian *Verbeekina verbeeki*, this unit should be Wordian in age. Thus, a fault in area of Khao Wong is noted as a reverse fault.

Period	Series	Stages	<p>Pitakpaivan, 1963; Baum et al., 1970; Igo, 1972; Toriyama et al., 1975, 1978; Toriyama and Kanmera, 1979; Ingavat et al., 1978; Pitakpaivan and Ingavat, 1978. Compiled by Toriyama, 1984.</p>	Stratigraphic range of units
Permian	Lopingian	Changsingian	<i>Paleofusulina sinensis</i> <i>Colaniella parva</i>	
		Wuchiapingian	<i>Lepidolina multiseptata multiseptata</i>	
	Guadalupian	Capitanian	<i>Colania douvillei Verbeekina verbeeki</i>	
		Wordian	<i>Neoschwagerina haydeni</i> <i>Afghanella schencki schencki</i>	
		Roadian	<i>Presumatrina schellwieni</i> <i>Neoschwagerina simplex</i> <i>Maklaya sethaputi</i> <i>Maklaya pamirica</i>	
	Cisuralian	Kungurian	<i>Maklaya saraburiensis</i> <i>Misellina confragaspira</i>	
		Artinskian	<i>Misellina otai Misellina cf. termieri</i> <i>Monodioxodina shiptoni</i>	
		Sakmarian		
		Asselian	<i>Triticites ozawai-Paraschwagerina yenangidai</i>	

Table 5.1 Schematic stratigraphic range of units in the thesis area (not to scale).

The evidence of fossils and rocks indicate that carbonate rocks of Tak Fa formation at Khao Wong and Khao Chakkachan deposit in shallow water, mostly outer shelf open marine environment.

5.2 Recommendations

Based on the preceding conclusions, the following recommendations are made.

1. Further study on biostratigraphy by expansion the study area.
2. Further study on taxonomy of abundant smaller forams, brachiopods, and algae.
3. Further study on paleo- environment.
4. Promote the study area as conservation zone and paleontological learning center for community.



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